

CLAIMS

1           1.     A combination energy absorption and environmental insulating  
2 barrier incorporated into a vehicle door trim panel assembly, comprising:

3                 a thermoformed shell having an exterior facing surface and an opposite  
4 recessed interior facing surface;

5                 a three-dimensional structural component having a specified length,  
6 width and thickness and which is configured to substantially seat against said  
7 recessed interior facing surface of said shell; and

8                 an exposed facing surface of said structural component securing against  
9 an inner associated surface of a vehicle door.

1           2.     The trim panel assembly as described in claim 1, said  
2 thermoformed shell being constructed of an acetyl butyl styrene material.

1           3.     The trim panel assembly as described in claim 1, further  
2 comprising a decorative covering applied against said exterior facing surface of  
3 said thermoformed shell.

1           4.     The trim panel assembly as described in claim 3, said decorative  
2 covering comprising at least a vinyl or leather material.

1           5.       The trim panel assembly as described in claim 1, said structural  
2 component being constructed of a durable plasticized and expanded foam  
3 material.

1           6.       The trim panel assembly as described in claim 5, further  
2 comprising a dimensional misalignment tolerancing established between said  
3 opposing facing surfaces of said thermoformed shell and said expanded  
4 structural component.

1           7.       The trim panel assembly as described in claim 6, further  
2 comprising interengaging portions established between said opposing surfaces  
3 of said shell and structural component and which facilitate inevitable  
4 misalignments due to tolerancing variances associated with said expanded  
5 foam component.

1           8.       The trim panel assembly as described in claim 7, said  
2 interengaging portions further comprising at least one of Velcro® portions,  
3 spring clips or other types of adjustable fasteners.

1           9.       The trim panel assembly as described in claim 7, further  
2 comprising at least one deflectable and in-molded fastener clip associated with  
3 said exposed facing surface of said expanded structural component and which  
4 engages through a proximately located aperture in the vehicle door.

1           10.     The trim panel assembly as described in claim 9, said structural  
2     insert having a specified shape and size and exhibiting properties selected from  
3     the group including moisture imperviousness, acoustical insulation and impact  
4     resistance.

1           11.     The trim panel assembly as described in claim 1, further  
2     comprising said structural component exhibiting a first three-dimensional  
3     exterior configured surface seating against said thermoformed shell, said  
4     exposed facing surface further comprising a second three-dimensional and  
5     exterior configured surface approximating that of the inner surface of the  
6     vehicle door.

1           12.     The trim panel assembly as described in claim 10, further  
2     comprising said three-dimensional structural component being constructed of  
3     an energy absorbing structural foam.

1           13.     The trim panel assembly as described in claim 12, further  
2     comprising said structural component being constructed of at least one of a  
3     urethane and an impact resistant styrene.

1           14.     A combination energy absorption and environmental insulating  
2     barrier incorporated into a vehicle door trim panel assembly, comprising:

3           a thermoformed and hardened shell having an exterior facing surface  
4           and an opposite recessed interior facing surface;

5           a three-dimensional structural component constructed of a durable  
6           plasticized and expanded foam material and exhibiting the properties of  
7           moisture imperviousness and impact resistance, said structural component  
8           having a specified length, width and thickness and which is configured to  
9           substantially seat against said recessed interior facing surface of said shell, a  
10          dimensional misalignment tolerancing being established between said opposing  
11          facing surfaces of said thermoformed shell and said expanded structural  
12          component; and

13          an exposed facing surface of said structural component securing against  
14          an inner associated surface of a vehicle door.

1           15.    A combination energy absorption and environmental insulating  
2           barrier incorporated into a vehicle door trim panel assembly, comprising: ✓

3           a thermoformed and hardened shell having an exterior facing surface  
4           and an opposite recessed interior facing surface, a decorative covering being  
5           applied against an exposed facing surface of said shell;

6           a three-dimensional structural component constructed of a durable  
7           plasticized and expanded foam material and exhibiting the properties of  
8           moisture imperviousness, acoustical insulation and impact resistance, said  
9           structural component having a specified length, width and thickness and which  
10          is configured to substantially seat against said recessed interior facing surface

11 of said shell, a dimensional misalignment tolerancing being established  
12 between said opposing facing surfaces of said thermoformed shell and said  
13 expanded structural component, interengaging portions being established  
14 between said opposing surfaces of said shell and said structural component and  
15 facilitating misalignment due to tolerancing variances associated with said  
16 expanded foam component; and

17 an exposed facing surface of said structural component including at  
18 least one deflectable and in-molded fastener clip for engaging through a  
19 proximately located aperture in a vehicle door to secure in place the trim panel  
20 assembly.

1 16. An energy absorbing and environmental insulating barrier  
2 incorporated into a vehicle door assembly, comprising:

3 a three-dimensional and expanded structural component having a  
4 specified length, width and thickness and which is configured to substantially  
5 seat within a recessed cavity associated with the vehicle door; and

6 a dimensional misalignment tolerancing established between opposing  
7 faces associated with the door and said expanded structural component.

1 17. A combination energy absorption and environmental insulating  
2 barrier incorporated into a vehicle door trim panel assembly, comprising:

3 a thermoformed shell having an exterior facing surface and an opposite  
4 recessed interior facing surface;

5           a three-dimensional structural component having a specified length,  
6       width and thickness and which is configured to substantially seat against said  
7       recessed interior facing surface of said shell; and  
8           a location of at least said thermoformed shell securing against an  
9       exposed surface of a vehicle door.

1           18.   The trim panel assembly as described in claim 17, said  
2       thermoformed shell further comprising at least one extending lip portion, in  
3       surface contact with the vehicle door surface, and through which is engaged a  
4       fastener.